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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
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ART UNIT	PAPER NUMBER
1626	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/576,282	PAPP ET AL.	
	Examiner	Art Unit	
	JASON NOLAN	1626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 June 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-14 and 16-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-14 and 16-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on June 12, 2009 has been entered. As filed, Claims 2-14 & 16-22 are pending in the instant application; of which, Claims 2-6, 9, 10, 13, 21, & 22 are currently amended. Claims 1 & 15 are cancelled.

Response to Amendment

Applicant's amendments with respect to Claims 2-6, 9, 10, 13, 21, & 22 have been fully considered and are entered. Said amendment cancelled Claim 1 and made Claim 21 the primary, independent claim. Claims 13 & 21 recite the same process according to former Claim 1; however, the scope of "base" has been reduced from base, generically, to a subgenus of bases that includes only tertiary amines or bases immobilized on a solid support. The use of a base in the continuous hydroformylation of the instant application is critical for patentability because the base is critical for improving stabilization. *See* comparative examples on p. 44 of the specification.

The prior art by Leung *et al*. (US 5,731,472) taught the use of *N*-heterocyclic bases for the stabilization of metal-organophosphite ligand complexes used in a hydroformylation process. The limitation of the '472 patent is that it fails to suggest

other bases. So, this begs the question: are there other known equivalents (of bases, such as tertiary amines) that are known in the art to stabilize the catalyst-ligand system in a continuous hydroformylation process that one of ordinary skill in the art would be aware of and at their disposal to try? The answer is yes, and a new ground of rejection is provided herein.

Specification

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999).

The term "phosphoramidite" in Claims 2-9, 11-14, 16, 17, & 20-22 is used by the claim to mean "a phosphorus-containing compound having at least one phosphorus atom to which one, two or three groups are covalently bound via a nitrogen atom, i.e. to form a P-N bond." *See* p. 5 of the specification. It is noted on the record that the scope of Applicant's definition is broader than the generally accepted meaning because it does not require a phosphorus-oxygen bond.

One accepted meaning is "a compound having the general structure $R_3R_4NP(R_2)$-O-R_1." *See* Oxford Dictionary of Biochemistry and Molecular Biology Rev. Ed., Smith, A.D., 1997, Oxford University Press, p. 504. Alternatively, phosphoramidite

is defined as having the structure $R_2NP(OR)_2$. *See* Organic Chemistry, 4th Ed., McMurry, J., Brooks/Cole Publishing Co., p. 1161, and Phosphorus An Outline of its Chemistry, Biochemistry and Uses, Fifth Ed. Corbridge, D.E.C. Elsevier, p. 407.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2-14 & 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahlers *et al.* WO02/083695, published 10/24/2002, *see* IDS (for convenience, references are made to the English translation: US 7,173,138) in view of Dennis *et al.* (US 4,567,306, *see* IDS).

Claim 22 is rejected over Ahlers *et al*. in view of Bunel *et al.* (US 6,229,052)

1. Determining the scope and contents of the prior art - Ahlers *et al.* ("the '138 patent") teaches the hydroformylation of compounds containing at least one ethylenically unsaturated double bond by reaction with carbon monoxide (CO) and hydrogen in the presence of a catalyst. Said catalyst preferably contains a phosphoramidite ligand (structures in Claims 9, 10, & 17) having a bridging group Q (structure in Claims 1 & 9). Claims 13-21 and Examples 1-37 (specification, col. 47-55) outline the synthesis, use, and stability of the phosphoramidite ligands.

Dennis *et al.* ("the '306 patent") teaches that when the hydroformylation process is conducted in the presence of tertiary amines the deactivation of the metal-organophosphorous ligand complex catalysts is lessened or prevented. The '306 patent demonstrates that better results are observed with the use of a tertiary amine in a comparison study of hydroformylation reactions with and without triethylamine (See Tables 1 & II).

Bunel *et al.* ("the '052 patent) teaches the use of a solid support for use in a hydroformylation process. The solid support appears in the Claim 1 as "Sup" and is defined as "a functionalized organic polymer resin" in Claim 2. Further clarification is provided in col. 5., ll. 61-67: which states that materials well known in the art, such as polystyrene supports and polyacrylamide supports, were contemplated. Such examples are the same type of supports contemplated in the instant application on p. 11, ll. 5-15.

One of ordinary skill in the art would recognize that the combined teachings of the '138 patent and the '306 patent and/or the combined teachings of the '138 patent and the '052 patent teach the scope of the instant claims.

2. Ascertaining the difference between the prior art and the claims at issue - the difference between the '138 patent and the instant application is that the former fails to use of a base for the stabilization of the hydroformylation catalyst system.

The difference between the '306 patent and the instant application is the organophosphorous ligand. The prior art uses phosphite ligands and the instant application uses phosphoramidite ligands.

The difference between the '052 patent and the instant application is the organophosphorous ligand. The prior art uses phosphite ligands and the instant application uses phosphoramidite ligands.

3. Resolving the level of ordinary skill in the pertinent art – the level of ordinary skill in the art may be found by inquiring into: (1) the type of problems encountered in the art; (2) prior art solutions to those problems; (3) the rapidity with which innovations are made; (4) the sophistication of the technology; and (5) the education level of active workers in the field. *Custom Accessories, Inc.*, 807 F.2d at 962. All of those factors may not be present in every case, and one or more of them may predominate. *Envtl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696 (Fed.Cir.1983).

Based on the typical education level of active workers in the field of synthetic organic chemistry, as well as the high degree of sophistication required to solve problems encountered in the art, the Examiner finds that a person of ordinary skill in the art would have at least a college degree in the field of organic chemistry and at least four years of work experience, i.e. a masters or doctorate level scientist.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness – the instant specification, p. 5, ll. 9-19, points out that the addition of a base provides additional stability to the hydroformylation catalyst and such stability is surprising because the ligands already contain basic nitrogen atoms. Applicants have provided studies of hydroformylation reactions comparing the results with and without the use of a base.

However, Applicant's finding that the use of a base improves the stability of the catalyst-ligand system and the overall result is not an unexpected finding. The art has long recognized a stability problem in continuous hydroformylation reactions. *See, i.e.* US Patents 4,260,828 and 4,283,562. Further, the particular use of a base to provide stabilization has been recognized in the art. *See, i.e.* US Patents 4,567,306 and 5,731,472.

Conclusion – The instant application is an optimization of a known catalytic hydroformylation process (specification, p. 1, l. 26); however, the improved process is not unexpected in view of the prior art. In view of the high level of skill in the art, the instant claims would have been suggested by the prior art as a whole because the art collectively teaches the use of phosphoramidite ligands in a catalytic hydroformylation process and the use of a tertiary base to add stability for organophosphorous ligands.

Further, the state of the prior art recognizes the use of solid supports in the hydroformylation process; and the success of substituting one organophosphorous ligand (phosphoramidite) for another (phosphite) is unlikely to be considered unpredictable or unexpected.

Telephone Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Nolan whose telephone number is (571) 272-4356 and e-mail is Jason.Nolan@uspto.gov. The examiner can normally be reached on Mon - Fri (9:00 - 5:30PM). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph M^{c}Kane can be reached on (571) 272-0699. The USPTO fax number for applications is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system, (either Private PAIR or Public PAIR). Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. For questions on Private PAIR system, contact the Electronic Business Center at (866) 217-9197.

/Jason M. Nolan/

Examiner, Art Unit 1626

/Rebecca L Anderson/

Primary Examiner, Art Unit 1626